

Furthermore, the mobile radio system in the present invention can be designed to be self organizing. By using new transmission methods such as JD-CMDA, it can provide very high transmission capacities. Such a combined system makes it possible to integrate virtually all the radio and mobile requirements which arise and operate with limited range and, possibly, with high traffic densities; such as wireless LAN, DSSS digital short range radio, LPD low power devices, TETRA trunked mobile radio and BOS, railroad radio, cordless telephones, mobile telephones, aviation radio, maritime radio, emergency paging systems and cordless buses (for control functions).

In one design variant of the present invention, the term duplex mode refers to a frequency division duplex (FDD) mode, and the term semiduplex mode refers to a time division duplex (TDD) mode. In this case, different frequency bands can be provided for the uplink (mobile station to base station) for FDD (Frequency Division Duplex) systems, such as the GSM system or UTRA (UMTS (Universal Mobile Telephony System) Terrestrial Radio Access) FDD mode than for the downlink (base station to mobile station), and different time periods can be provided for the uplink and downlink for TDD (Time Division Duplex) systems such as DECT (Digital Enhanced Cordless Telecommunications) system or the UTA (UMTS (Universal Mobile Telephony System) Terrestrial Radio Access) TDD mode.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

ABSTRACT OF THE DISCLOSURE

A mobile radio system containing a number of mobile stations, with the mobile stations having the ability to carry out transmission/reception operation in the duplex mode and in the semiduplex mode.

In the claims:

On page 8, cancel line 1, and substitute the following left-hand justified heading therefor:

I Claim as My Invention:

Please cancel claims 1-15, without prejudice and substitute the following claims therefor:

16. A mobile radio system, comprising:

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at least one base station; and

a plurality of mobile stations including at a least first and a second mobile station,
each of the plurality of mobile stations able to carry out transmission and reception operations
in both a duplex mode and a semiduplex mode, the duplex mode being a frequency division
5 duplex mode and the semiduplex mode being a time division duplex mode;

wherein the first mobile station simultaneously carries out transmission and reception
operations with the at least one base station in the duplex mode and carries out transmission
and reception operations with the second mobile station in the semiduplex mode.

10 17. A mobile radio system as claimed in claim 16, wherein the transmission and
reception operations of the first mobile station are carried out cyclically in time slots, the time
slots for the duplex and semiduplex modes running synchronously with respect to one
another.

15 18. A mobile radio system as claimed in claim 16, wherein signals from the
second mobile station are transmitted via the first mobile station to the base station, and
signals from the base station are transmitted via the first mobile station to the second mobile
station.

20 19. A mobile radio system as claimed in claim 17, wherein signals from the
second mobile station are transmitted via the first mobile station to the base station, and
signals from the base station are transmitted via the first mobile station to the second mobile
station.

25 20. A mobile radio system as claimed in claim 16, wherein the first mobile station
further carries out transmission and reception operations with a third mobile station in the
semiduplex mode.

30 21. A mobile radio system as claimed in claim 17, wherein the first mobile station
further carries out transmission and reception operations with a third mobile station in the
semiduplex mode.

22. A mobile radio system as claimed in claim 18, wherein the first mobile station further carries out transmission and reception operations with a third mobile station in the semiduplex mode.

5 23. A mobile radio system as claimed in claim 19, wherein the first mobile station further carries out transmission and reception operations with a third mobile station in the semiduplex mode.

10 24. A mobile radio system as claimed in claim 16, wherein the first mobile station further carries out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

15 25. A mobile radio system as claimed in claim 17, wherein the first mobile station further carries out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

20 26. A mobile radio system as claimed in claim 18, wherein the first mobile station further carries out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

25 27. A mobile radio system as claimed in claim 19, wherein the first mobile station further carries out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

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28. A mobile radio system as claimed in claim 24, wherein the plurality of mobile stations are coupled to one another to form at least one of a communication chain and a communication network.

5 29. A mobile radio system as claimed in claim 16, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

10 30. A mobile radio system as claimed in claim 17, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

15 31. A mobile radio system as claimed in claim 18, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

20 32. A mobile radio system as claimed in claim 19, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

25 33. A mobile radio system as claimed in claim 20, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station

and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

34. A mobile radio system as claimed in claim 21, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

35. A mobile radio system as claimed in claim 22, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

36. A mobile radio system as claimed in claim 23, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

37. A mobile radio system as claimed in claim 24, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

38. A mobile radio system as claimed in claim 25, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

39. A mobile radio system as claimed in claim 26, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

40. A mobile radio system as claimed in claim 27, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

41. A mobile radio system as claimed in claim 28, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

42. A mobile station in a mobile radio system, comprising a part for simultaneously carrying out transmission and reception operations with a base station in the mobile radio system in a duplex mode, and carrying out transmission and reception operations with a second mobile radio station in the mobile radio system in a semiduplex mode, wherein the duplex mode is a frequency division duplex mode and the semiduplex mode is a time division duplex mode.

43. A mobile station in a mobile radio system as claimed in claim 42, wherein the transmission and reception operations of the first mobile station are carried out cyclically in time slots, the time slots for the duplex and semiduplex modes running synchronously with respect to one another.

44. A mobile station in a mobile radio system as claimed in claim 42, wherein signals from the second mobile station are transmitted via the first mobile station to the base station, and signals from the base station are transmitted via the first mobile station to the second mobile station.

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45. A mobile station in a mobile radio system as claimed in claim 43, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

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46. A mobile station in a mobile radio system as claimed in claim 42, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode.

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47. A mobile station in a mobile radio system as claimed in claim 43, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode.

48. A mobile station in a mobile radio system as claimed in claim 44, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode.

49. A mobile station in a mobile radio system as claimed in claim 45, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode.

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50. A mobile station in a mobile radio system as claimed in claim 42, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station

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are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

51. A mobile station in a mobile radio system as claimed in claim 43, further
5 comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

10 52. A mobile station in a mobile radio system as claimed in claim 44, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

15 53. A mobile station in a mobile radio system as claimed in claim 45, further comprising a part for additionally carrying out transmission and reception operations with a third mobile station in the semiduplex mode, such that signals from the second mobile station are transmitted via the first mobile station to the third mobile station, and signals from the third mobile station are transmitted via the first mobile station to the second mobile station.

20 54. A mobile station in a mobile radio system as claimed in claim 42, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the
25 second mobile station.

30 55. A mobile station in a mobile radio system as claimed in claim 43, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

56. A mobile station in a mobile radio system as claimed in claim 44, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

57. A mobile station in a mobile radio system as claimed in claim 45, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to the base station, and the transmission of signals from the base station via the first mobile station to the second mobile station.

58. A mobile station in a mobile radio system as claimed in claim 46, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

59. A mobile station in a mobile radio system as claimed in claim 47, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

60. A mobile station in a mobile radio system as claimed in claim 48, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at

least one of the base station and the third mobile station via the first mobile station to the second mobile station.

61. A mobile station in a mobile radio system as claimed in claim 49, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

62. A mobile station in a mobile radio system as claimed in claim 50, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

63. A mobile station in a mobile radio system as claimed in claim 51, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.

64. A mobile station in a mobile radio system as claimed in claim 52, wherein the first mobile station may switch on and off, at least one of manually and automatically, the transmission of signals from the second mobile station via the first mobile station to at least one of the base station and the third mobile station, and the transmission of signals from at least one of the base station and the third mobile station via the first mobile station to the second mobile station.